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Navigating the authority paradox: Practising objectivity in environmental expertise

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ABSTRACT

We empirically reveal how environmental experts interpret the objectivity norm while navigating the authority paradox. The paradox here is that while there is a need for objective scientific advice, such advice is only to be acquired from experts and expert agencies whose objectivity and, hence, authority are contested. Viewed through the lens of practice, we identify what practitioners at the PBL Netherlands Environmental Assessment Agency understand by objectivity. Using this paradigmatic case, we show how practitioners renegotiate the meaning of objectivity while seeking to engage with new policy actors and extended peers in an independent, rigorous and legitimate manner. Successfully navigating the authority paradox is related to skilfully representing and adapting to various meanings of objectivity. Experts and experts agencies accordingly need reflexive skills to recognise which meanings of objectivity they ascribe to and which ones are invoked in public debates. Environmental experts who are able to loosely connect diverse objectivity conceptions are more likely considered as trustworthy and authoritative partners in environmental science-policy interfaces.

1. Introduction

For government expert agencies to properly perform their role as credible and influential science-policy interfaces, it is vital that their authoritativeness is publicly recognised. Do government expert agencies generate new ways of demonstrating their authority, given that in present-day society their public legitimacy – grounded in claims of objectivity – is often publicly challenged? Drawing on empirical work, particularly in the field of climate science and politics (Beck et al., 2014; van der Sluijs et al., 2010), we can say that this hardly seems to be the case; on the contrary, the norm of objectivity seems to be reinforced by the media, as well as by scientists and the expert agencies themselves.

Experts typically seek to conform to identity norms, like objectivity, when approaching their task (Hilgartner, 2000). Tracing the historical and cultural origins of objectivity reveals that over time the word 'objective' has acquired different meanings and associated scientific practices (Daston and Galison, 2007). There is no single definition that captures the meaning of objectivity and new meanings are added as practices change over time, giving objectivity its irreducible complexity (Douglas, 2004). In science-policy interfaces objectivity plays a dual role in distinguishing valid policy-relevant knowledge from mere politics. Objectivity in the sense of what counts as proper scientific representation of nature, and objectivity in the sense of the role of public interests and values in the reasoning process. This double objectivity, scientific and political, is achieved through institutional projections of credibility and truth to policy makers and other audiences (Jasanoff, 2011). Institutionalised forms of scientific advice to governments, therefore, routinely commit to objectivity as a central identity norm to ensure that the advice has credibility and influence in society, thus assuring their authoritativeness (Bijker et al., 2009; Hilgartner, 2000; Jasanoff, 2005).

Institutional responses to credibility crises in scientific advice to governments, e.g. the Climategate affair, signal that expert agencies like the Intergovernmental Panel on Climate Change (IPCC) wish to restore public faith in their autonomy, openness and disinterest. They employ 'repair' strategies by increasing the transparency of their scientific procedures and extending peer review to include non-scientific peers in the assessment process. The IPCC's relationship to public policy and its various global 'public' audiences is hardly subjected to critical debate (Beck et al.,

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2014; van der Sluijs et al., 2010). Accordingly, the epistemic power of the IPCC remains unchallenged and unreflexively guides a global and science-based understanding of climate change, subordinating plural and local understandings of climate change to a singular technocratic framework (Turnhout et al., 2016).

We have conceptualised this situation as an 'authority paradox'[1]: large uncertainties and value conflicts reinforce the need for authorities who can speak in the name of an objective science at a time when the objectivity of experts and expert agencies is subjected to public scrutiny. Public challenges of the objectivity of expertise are undermining the authority of scientific experts. The paradox here is that while there is a need for objective scientific advice, such advice can only be acquired from experts and expert agencies whose objectivity and, hence, authority are contested (Bijker et al., 2009; Gluckman and Wilsdon, 2016). Institutionalised forms of scientific advice to governments are faced with this paradox. Government expert agencies increasingly have to operate in disparate multi-actor and multi-level settings where policy issues – especially in the environmental field – are marked by severe political pressure, disputed values, high stakes in decision-making and very large epistemological and ethical system uncertainties (Funtowicz and Ravetz, 1993).

How do the experts themselves navigate the authority paradox? This question is best examined in situations where experts start actively questioning, challenging and innovating their practices, while they aim to safeguard their credibility and influence as an authority.

In this paper we present an empirical study to show how practitioners in a Dutch government expert agency, the PBL Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving* – PBL), interpret the objectivity norm when considering their role as credible and influential experts in today's constantly changing governance settings and issue configurations.

Taking the PBL as a paradigmatic case (Flyvbjerg, 2006), this paper sheds light on the wider problem of persistent technocratic and science-based environmental knowledge production systems (Turnhout et al., 2016). Participatory or transdisciplinary modes of knowledge production have proven hard to establish due to disciplinary traditions and expert-driven research cultures in the home institutions of experts (Mattor et al., 2014; Sternlieb et al., 2013). There is a tendency in environmental science-policy interfaces to institutionalise new modes of knowledge production in accordance with prevailing values of scientific independence and autonomy (Lovbrand, 2011; Van der Hel, 2016). In practice, therefore, these attempts appear to deviate little from, and can even reinforce, a technocratic style of working (Reinecke, 2015; Turnhout et al., 2013). Experts tend to "do [. . .] more of the same under a different name" ((Van der Hel, 2016): 173). The lens of practice, in this paper adds a new perspective to institutional tensions in science-policy interfaces by illustrating the complexity of the objectivity norm (Douglas, 2004). In the next section, we will introduce the PBL as a paradigmatic case for government expert agencies seeking to navigate the authority paradox. We then explain our methods of data collection and analysis. The empirical section of the paper shows how PBL practitioners start questioning, challenging and innovating their practices and develop new meanings of objectivity at the same time. The paper concludes by pointing out how the authority paradox may be successfully navigated by experts in environmental science-policy interfaces.

2. The PBL as a paradigmatic case

The PBL Netherlands Environmental Assessment Agency can serve as a paradigmatic case (Flyvbjerg, 2006) for government expert agencies seeking to navigate the authority paradox. Using this case, we can learn something about the way practitioners conform to the identity norm of objective science, while they start to consider and evaluate their assessment approaches and expert roles in today's advisory setting of constantly changing governance and issue configurations. This section introduces PBL' position at the Dutch science-policy interface and illustrates its responses to credibility crisis in the past.

The PBL is the Dutch national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. It is a government-funded expert agency that aims to "contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount." PBL holds the legal status of a policy assessment agency with "a prime concern to generate policy-relevant studies in an independent[2] and scientifically sound manner" (PBL, 2016).

PBL's activities fulfil a traditionally-determined authoritative role for a small group of professional representatives and government. First and foremost, PBL works closely with government departments that oversee its operation and research capacity. PBL is presented in the public debate as a powerful institute that disciplines policy-makers into rational policy making; using impartial calculation methods to assess policy goals and options in a way which is neutral and non-partisan (Halffman and Hoppe, 2009). The rhetoric of objectivity is deployed not only by the agency itself (Kunseler, 2016), but also by politicians and policy-makers who seek to correct one another with claims of expertise. They accept PBL's knowledge as 'best guess' statements to create the playing field in which they operate and bargain, because "questioning this would lead to a swamp of policy unpredictability" (de Vries, 2008).

While the authoritativeness of the PBL is firmly grounded in its legal (de jure) position as an independent government expert agency, in practice PBL practitioners tend to define their expert role flexibly when dealing with different clients and public audiences, by skilful boundary work (Hoppe, 2009; Huitema and Turnhout, 2009; Pesch et al., 2012). In this way they can ensure that there is an organisational fit with a policy field or issue based on PBL's mandate to produce science-based policy-relevant studies. Authoritativeness in such dynamic boundary processes comes from playing a credible role in a succession of concrete situations. This creates a de facto (real) authority alongside PBL's de jure (legal) authority (Hajer, 2009, 2012), which then leads to the accumulation of epistemic authority over time.

Nonetheless, PBL's credibility has been called into question on several occasions e.g. when errors became evident or when PBL was accused of an ideological or political bias. Against the background of today's complex governance settings and issue configurations, PBL can expect to increasingly face potential credibility issues, especially as uncertainties and value controversy

[1] Bijker et al. (2009) introduce the paradox of scientific authority to investigate how the Health Council of the Netherlands manages to maintain its position of scientific authority, while that authority seems to be deteriorating in the rest of Dutch society. Hajer (2009) introduced the authority paradox to explain how "the phenomenon of media 24/7 multiplies the attention for the classical-modernist political centre at a time at which crucial problems often spill over jurisdictions, disempowering the political centre" (p.176). Both Bijker et al. and Hajer showed how the paradox expresses itself in institutional settings whose classical-modernist roots are challenged by appeals for democratisation.

[2] This independence is laid down by law in the Regulation for Policy-Analysis Agencies, article 4, which states that Dutch policy-assessment agencies (*planbureaus*) are solely responsible for the content and quality of their work and that policy-makers should refrain from interfering with research content and methods (Staatscourant, 2012).

surrounding knowledge claims continue to grow in constantly changing constellations of actors. Besides working with government departments and parliament, PBL has to relate to civil society stakeholders, as well as supra-national and regional levels of government, each of which bring their own claims, stakes and values to the assessment process (Halffman, 2009).

When credibility has been contested in the past, this has led PBL to formulate new strategies and procedures to deal with uncertainties and perspective plurality. This is illustrated by PBL's methodology guidelines for uncertainty assessment and communication, stakeholder participation, scenario building and peer review (Dammers et al., 2013; Hage and Leroy, 2008; Kunseler et al., 2014; Petersen et al., 2013). Despite the mandatory status of these guidelines as part of quality assurance procedures, a methodological support unit and training in the use of these guidelines, they are not always fully utilised in PBL projects. There still seems to be insufficient understanding in the organisation concerning the basic values and beliefs underlying these guidelines, and limited room to accommodate them given PBL's institutionalised interface position (Petersen et al., 2011). It appears paradoxical that PBL practitioners learn to reflect upon organisational routines in order to detect unnoticed biases and unbalanced framing (reflexive logic[3]), but remain committed to institutionalised beliefs in science-politics demarcations, objective science and scientific privilege (modernist logic) (Kunseler, 2016).

Illustrative of this paradox in the PBL context is an example described by PBL's former director (from 2008 to 2015), Maarten Hajer, a renowned scholar in public policy and political sciences. A deliberative assessment process had to restore public trust in climate science[4] but – in his view- nearly split PBL in two:

> "*Between February and July 2010 some 35 researchers at the PBL contributed to an investigation of the IPCC's fourth assessment report, checking the text for more errors. This assignment nearly split the institute (in total some 250 full-time equivalent [personnel] (FTE), of which approximately 200 FTE researchers) in two. About half the academic staff were convinced this was an assignment that could only do damage to the IPCC and would lead to the demise of the PBL as an internationally respected research institute; the other half argued there was no choice and we should act on a parliamentary request in a responsible way. A small subsection of the latter half saw it as a challenge and regarded it as an important experiment in an attempt to find a new form of scientific governance.*" ((Hajer, 2012): p. 455)

Without going into further detail, this example strikingly illustrates how the use of a deliberative approach to generate and restore PBL's authority appeared to invoke practical concerns among the majority of the PBL population and experimental enthusiasm among a few. In the remainder of this article we will focus on these practical concerns and explore how they reflect interpretations of the objectivity norm.

3. Research design

Seen through the lens of practice, organisational practices are always open to contestation and this keeps them continuously in a state of tension and change. This view is broadly placed in what has been termed 'the practice turn' in social theory (Nicolini, 2012). It was inspired by developments in sociology as well as in science and technology studies. This practice approach is suitable for the study of science-policy interfaces as a social practice (van den Hove, 2007), because it takes social structures and institutions, like the objectivity norm, not simply as given but considers how they are interpreted and re-interpreted in the day-to-day work of social actors. Thus, from the practice perspective, changes in scientific advice to government arise from processes that are rather difficult to steer or predict (Arts et al., 2014). Zooming in on practical concerns directs attention towards the dynamic between invention and improvisation and the limits imposed by institutionalised norms and conditions. A focus on practical concerns enables us to appreciate PBL's practices as acts of 'bounded creativity': "the variety of ways in which [practitioners] can creatively engage with the practical concerns set up by a practice is bounded by the limits imposed by external conditions and criteria of accountability" (Nicolini, 2012): 226).

To surface the practical concerns which govern and affect PBL practitioners, and to appreciate them from their perspective the design of our research is informed by an interpretive, naturalistic approach which enables us to "study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meaning that people attribute to them" ((Denzin and Lincoln, 2013), p.3). We identified the varied and multiple meanings that PBL practitioners attribute to objectivity as they emerge from the practices carried out in the PBL organisation. Their interpretations and the interaction between them provided the basis for our study (Creswell, 2003). We made use of participatory observation and document analysis of informal discussions in PBL. We also conducted interviews with practitioners about the challenges they face in their daily work. Our material was derived from three in-house activities that PBL practitioners could take part in on voluntary basis. Although the activities were not necessarily restricted to a discussion of PBL's roles and the design and quality of deliberative assessment approaches in today's critical society, as it turned out, concerns related to these matters attracted considerable attention. These three in-house activities were:

1. A seminar on expert roles, organised on 18 January 2011, with the aim of developing a more sophisticated understanding by some 40 participating PBL practitioners of their own expert roles. The session reports and final meeting report served as material for our research. We further drew on ten interviews which we and others conducted with ten project leaders prior to the seminar, asking for their own experience of science-policy-society interactions. More details are available in a PBL working paper (de Wit et al., 2014).
2. An internal strategy project conducted from spring 2014 to spring 2015 with the aim of reflecting upon the implementation of open assessment methods and tools in PBL activities (in the PBL context this term refers to methods and tools that increase transparency concerning uncertainties and perspective plurality). The research was conducted by an external consultant who interviewed 13 PBL practitioners (mainly methodology and modelling experts) about their experience of and reflections on open assessment in the PBL context, and two external methodology experts about the theory of open assessment methodology.
3. A PBL course with eight PBL practitioners (mainly project leaders) who discussed their experiences on interacting with policy actors and stakeholders. The aim of the course was to enable PBL practitioners to gain a clearer understanding of recent insights in science-policy literature. The course consisted of reading of science-policy literature, three working sessions

[3] Under a reflexive logic practitioners reflect upon frames of reference including disciplinary, institutional and cultural routines, norms and beliefs. They acknowledge the limits of scientific prediction and control prevalent under a modernist logic, and come to grips with a socially contingent understanding of knowledge in society (Kunseler, 2016).

[4] PBL was tasked by the Minister of Infrastructure and the Environment with reviewing the IPCC Fourth Assessment Report in response to media debate about mistakes in the regional assessment part. For this purpose PBL organised an extended peer review process in which critical peers and public parties were invited to contribute to the review of potential mistakes.

and individual assignments and was conducted from autumn 2014 to early spring 2015.

Our involvement in these activities as co-organisers (EK and WT activity 1), coordinators (EK activity 2; WT activity 3) and participants (EK, all activities; WT, activity 2) enabled us to observe and experience the practical concerns of PBL practitioners. Experience and proximity to the reality studied lie at the very heart of case study research (Flyvbjerg, 2006) and help to provide insight into the contingent and partial processes of organisational change and innovation (Pallett and Chilvers, 2014). Intersubjectivity is an important asset in interpretive inquiry, given that the interpretation of meanings and relationships can have different connotations depending on one's own points of reference (Burawoy, 1998). We ensured intersubjectivity in dialogue among ourselves, by member checking quotes with participants, and with qualitative content analysis to guide our search for patterns across the data (Weiss, 1995). Firstly, we selected excerpts that point to dilemmas on how to sustain PBL's authority as a credible and influential science-policy interface in a critical society. Secondly, we identified how practitioners discussed these dilemmas, and we analysed how their practical concerns reflect their interpretations of objectivity.

4. The complexity of the objectivity norm

We identified three types of dilemmas: how to engage with policy actors, how to work with extended peers and stakeholders and how to justify new role interpretations. These three dilemmas are presented as questions in column 1 of Table 1. In discussing these dilemmas, we see how PBL practitioners seek to assure objectivity, which reveals the various interpretations of objectivity within the PBL organisation (column 2).

4.1. How to appropriately balance distance from and engagement with policy actors?

Questions raised during the role seminar illustrated that practitioners seek to strike the right balance between maintaining a distance from and engaging with policy actors other than government departments, to guide their role in changing governance configurations: "*to what extent are regional and local governments allowed to request advice from PBL, now that policy tasks in the field of nature, spatial planning and the environment are largely decentralised?*" And "*can PBL act as a direct adviser to the European Commission?*" And "*how to position ourselves in relation to non-government actors, such as businesses, who are involved in policy processes*?" (quote derived from activity 1)

On the one hand they recognise the advantages of deliberation with these policy actors to facilitate policy learning and to ensure the balance with respect to a spectrum of values (value-neutrality). The following quote illustrates that a focus on policy learning and value-neutrality is seen to match PBL's mission as an independent intermediary at the science-policy interface:

> *"The strength* [of PBL] *lies in discussing issues outside frameworks. Its strength is to set the agenda. This is what I am often told* [by policy-makers]. *PBL employees are judged on the basis of those four studies that add more perspective to what policy-makers are concerned with on a daily basis. PBL therefore has to be able to act as an independent intermediary."* (1)

Engagement with policy actors facilitates policy learning, but it requires an independent position in order to make judgements (i.e. recommendations) that are balanced towards the various stakes and values represented by the parties involved: "*The width of the programme, the various government levels involved and the independent role of PBL allow room for us, as an independent party, to make critical recommendations to the various parties.*" (2) And she adds: "*As we do have some 'weight' now, this is going well.*" (2)

Conversely deliberative approaches are also considered risky given the importance of sustaining PBL's independent position: "*You see what happens from less of a distance; the mirror of independence is less evident. You become a part of the whole. You have to be highly alert in such processes. On the one hand you want to conduct participatory research in order to invoke learning. But on the other hand this implies that you become dependent on others for this to happen. And you become part of it, at least a bit. Researchers do not like it if you move too far in this direction.*" (2)

Thus, engagement calls into question PBL's detachment from politics and the particular beliefs advocated in these processes: "*The external world perceives our engagement with the actors involved in policy preparation as different from what would be expected* [i.e. a more distant stance] *. . . while external parties essentially should see PBL as an independent broker.*" (2) In order to safeguard an independent position, PBL should therefore refrain from political interference: "*We cannot become part of the process* [i.e. of policy negotiation and formulation]" (1). Ensuring the objectivity of PBL seems to require clear demarcations between PBL's role as a provider of independent knowledge and the political processes in the policy network or system

This leads us to conclude that the dilemma of how to strike a balance between distance from and engagement with policy actors, reflects practical concerns on how to ensure the independence of the knowledge generated in deliberative assessment processes. The usage of the term independence reveals interpretations of objectivity related to the role of values in the assessment process. On the one hand, independence is assumed to be necessary in order to create distance from points of view advocated in political and governance processes. Detachment assures that deliberative assessment processes generate objective outcomes. While engagement with these same policy actors is perceived as necessary to generate objective – in the sense of value-neutral – scientific advice that facilitates policy learning, since it balances the various views and accordingly adds (critical) perspectives to political debates.

4.2. Do extended peers and stakeholders contribute to or rather limit the quality of PBL assessments?

The core business of the PBL is to produce science-based assessments. In so doing, PBL practitioners carefully manage the

Table 1
Overview of findings from the empirical analysis, illustrating dilemmas raised by practitioners at PBL the Netherlands Environmental Assessment Agency and the interpretations of objectivity reflected in these dilemmas.

Dilemmas raised by PBL practitioners	Interpretations of objectivity reflected within dilemmas
How to appropriately balance distance from and engagement with policy actors?	Addressing the role of values in deliberative assessment processes
Do extended peers and stakeholders contribute to or rather limit the scientific quality of PBL assessments?	Addressing the rigour of the knowledge that is generated in deliberative assessment processes
Do different role interpretations than those traditionally expected put the legitimacy of the PBL at risk?	Addressing the legitimate design and implementation of deliberative assessment processes

quality of their assessment processes. However, they recognise that they are inevitably subject to bias themselves. Extended peer review is therefore considered a crucial quality assurance strategy: "*Does our environmental idealism influence our work? Inevitably there is a bias, but the question is how you deal with it? The idea would be to organise your own criticism in all phases of your project and involve different stakeholders in doing so. This way, you can neutralise the bias.*" (1)

While supporting extended peer review, the dilemma practitioners experience is how to organise extended peer review in such way that it enhances quality without limiting the rigour of the assessment process, as the following quote illustrates: "*I am a proponent of extended peer review, but you have to channel it and actively manage it: what is it you want a response to and from whom? Otherwise you won't*receive a response but only trigger 'conflict'. *In an ideal world, a research project is like architecture designed in a public space where everyone can respond to inspire the architect.*" (3)

There is a tendency among PBL practitioners to place extended peers in a subordinate position, where they may be 'invited', but not 'steer' or 'co-produce' the assessment process: "*Co-production brings opportunities and risks: do we have enough distance? Can we maintain our line of argument? In unstructured*[5] [i.e. value laden and highly uncertain] *situations you need to adopt a position to be able to present a clear line of argument.*" (3) PBL practitioners aim to ensure control over deliberative assessment processes which they justify in terms of the need for 'a clear line of argument', the rigour of which they believe may be put at risk when extended peers play a more prominent role.

Even when stakeholders are given a more prominent role during the framing of assessments, PBL practitioners apply scientific procedures to exclude speculations from the process: "*In the stakeholder dialogues on urban sustainability we asked them [i.e. stakeholders] to underpin their views*[6] *with reference to evidential relationships, such as the health effects of environmental problems. Themes raised during the dialogue underpinned with less clear evidence, such as flexibility, freedom of choice and social cohesion were scientifically processed* [i.e. using expert consultation and scientific literature review] *after the meeting.*" (2)

Based on our analysis we may conclude that deliberation with extended peers and stakeholders raises quality concerns. Practitioners' interpretations of objectivity are reflected in their views on how to sustain the rigour of the knowledge that is generated in these processes. Extended peers and stakeholders are seen to contribute to the rigour of the assessment outcomes on the one hand. Deliberations trigger reflection upon institutionalised frames of reference, and prevent bias or normative framings to go unnoticed. On the other hand PBL practitioners want to control the quality of stakeholders' contributions and tend to impose scientific standards and procedures to generate reliable knowledge.

4.3. Does adopting different roles than those traditionally expected put the legitimacy of the PBL at risk?

Adopting different roles than those traditionally expected is perceived as putting the legitimacy of the PBL at risk, as certain roles may contradict one another. Several questions raised during the role seminar illustrated these practical concerns: "*How to remain independent assessors while actively assisting in policy and public debates as well?*" and "*How to act both as an independent assessor and strategic adviser in the same policy field?*" (1).

For example, when involved in policy development and then evaluating the same policy later, PBL might be seen as a "*butcher judging his own meat*" (1). The outside world may accordingly consider the mission of the institute ambiguous: "*the untrustworthy chameleon*" (1).

PBL practitioners want to safeguard their legitimacy, while new roles may challenge this position: "*The outside world perceives our closer involvement with policy preparation as a 'special role', which is seen as a change in which you need to maintain your independent role.*" (1)

As they see it, new roles are nevertheless useful in unstructured problem settings. In these settings, PBL practitioners perceive the need for deliberation across knowledge perspectives and for convergence towards a convincing result: "*If you deal with unstructured problems you have to interact with politics and policy and with people offering knowledgeable contributions in order to get to an action perspective.*" (2)

When practitioners practice such new roles they experience considerable implications for their work process – they need to make use of novel methods and organise the assessment process differently than they are used to, as the following two quotes illustrate:

> *"During the workshop this was noticeable; the experts* [i.e. the PBL practitioners] *did not adopt their old roles. Which was difficult once we experienced the implications on our work. For example, how should I design my presentation now that it will not be the focus of the workshop? We do not 'determine', but 'follow'. You are put outside your comfort zone, which we are not used to. As a presenter in such a workshop you are no longer sure of what to present, since someone else may have said it already."* (3)
>
> *"Reflexive monitoring*[7] *allows you to discover why something works well or not in the process. These are also your research findings. It is a different methodology that gives different types of results. If it turns out during the process that there is no support for the concept* [i.e. the issue framing] *from the actors involved, then this is your research finding; which is somewhat awkward for the researchers at PBL.*" (2)

These quotes illustrated how practising new roles raises legitimacy issues that relate to the design of the assessment process (e.g. the use of reflexive methods and 'open' presentations) and the conditions for deliberative assessment processes (e.g. the power dynamics between PBL and participating actors).

Thus, new roles seem to be justified when PBL practitioners can contain and define these new roles in a legitimate manner. Their interpretations of objectivity relate to the legitimacy of the design and implementation of deliberative assessment processes. New roles give more prominence to interaction and discussion among participants which may generate objectivity interactively; that is deliberation helps to eliminate predetermined framings from the assessment process. New roles are also considered risky given the importance of PBL's independent stance (in the sense of detachment, see dilemma 1). Objectivity in this sense implies that a certain degree of distance (from points of view advocated in political and governance processes) has to be maintained in deliberative assessment processes to assure the legitimacy of the outcomes it produces. Ensuring the objectivity of PBL is thus

[5] When using the notion of unstructured problems, PBL practitioners refer to Hisschemöller and Hoppe (1996) who define four types of problems along two axes, reflecting the level of agreement about values and certainty about knowledge. Unstructured problems are deemed to be far from certain and far from agreement.

[6] It is important to note here that it was not possible on the basis of our material to distinguish between PBL practitioners' valuation of input from stakeholders with regard to their arguments and their world views.

[7] Reflexive monitoring (van Mierlo et al., 2010) was recently introduced as a new mode of assessment in the PBL context. The method supports systems innovation in transdisciplinary research settings.

considered to be a matter of seeking to adopt new roles in a legitimate manner.

Overall, we may conclude that the complexity of the objectivity norm provides for both stability and flexibility in practices of government science advising. Practitioners' interpretations of objectivity seem to be guided by external conditions, on the one hand: "*The PBL mission is defined and informs our practices, but we can see that things change and that questions change. In principle this would allow us to work differently.*"(2) While on the other hand they act as agents of change for themselves in creating and inventing novel approaches, which adds new meanings of objectivity to their repertoire: "*Would it perhaps be possible to include special practices, for example, the advisory practice of 'knowledge at the table*[8] *as part our advisory repertoire? Could PBL develop new products relating to these special roles and which are recognisable to the outside world?*" (1)

5. Navigating the authority paradox?

We have shown that PBL practitioners hold a deep and complex understanding of the objectivity norm, which supports their position as a credible and influential government expert agency operating at the Dutch environmental science-policy interface. By emphasising on independence, rigour and legitimacy they seek to ensure that their advice has credibility and influence in society, thus assuring their authoritativeness. Seen through the lens of practice, we showed how the objectivity norm of what is deemed as independent, rigorous and legitimate knowledge was situationally interpreted, in view of particular practical concerns. New meanings of objectivity are added in circumstances where this serves to increase relevance and credibility. Engagement with policy actors becomes necessary to generate independent – in the sense of value-neutral – scientific advice that facilitates policy learning. Extended peer review becomes necessary to improve the rigour of the assessment outcomes as it prevents bias or normative framings to go unnoticed. New roles become necessary to give prominence to interaction and discussion among participants which may improve the legitimacy of the assessment process. Conversely, practitioners still often interpret objectivity conform the prominent 19th century representation of 'objectivity as scientific truth' (Daston and Galison, 2007). Practitioners emphasise on independence to distance themselves from points of view advocated in political and governance processes; and on scientific rigour to control the quality of stakeholders' contributions in order to generate reliable knowledge.

The practice view in this article, in effect, explains, in our view, why experts tend to do more of the same under a different name (Turnhout et al., 2016, 2013; Van der Hel, 2016) . Institutional representations of the objectivity norm cannot be changed overnight, while at the same time, when experts 'improvise' they tend to stretch the boundaries of what is 'appropriate'. PBL practitioners creatively engage with the dilemmas they raise within the limits imposed by the institutional setting. A sense of 'fit' and human agency often go together in intuitively bringing new modes of knowledge production to fruition (Regeer, 2009). This leads to diversification of approaches, identities and roles in government science advising. In our case, PBL practitioners acknowledged that serving the Dutch government with appropriate knowledge in a 21st century critical society inevitably requires them to explore the added value of deliberative modes of assessment. The practical concerns that accompany this process of change reflect how internalised notions of objectivity become flexible in usage.

Practitioners in this case highlighted both scientific and political accounts of objectivity (Jasanoff, 2011); their interpretations related to the quality of knowledge, the role of values and the design of assessment processes. They loosely connected these different meanings of objectivity. Loose connections such as these tend to provide coherence to organisational practices (Douglas, 2004).

To navigate the authority paradox successfully is related, thus, to skilfully representing, elaborating and correcting meanings of objectivity that have been brought to the fore (Hajer, 2009). Experts should be well aware of their own usage of the term, but also of the meanings invoked by others. Interpretations of objectivity in practices of government science advising not necessarily interconnect with the ways other practices – such as governance or media practices – invoke the term. The complexity of objectivity allows room for its flexible usage, but may as well lead to strong normative debates on the (lack of) trustworthiness of expertise (Douglas, 2004). This is exactly what happens during credibility crises. Once objectivity of expertise is called into question, the basis for trust is gone. In order to restore a sense of trustworthiness, experts need to be able to relate to many different publics and work together different meanings under a shared idea of objectivity (Douglas, 2009; Hajer, 2009). Training in reflexive skills may help experts in recognising which meanings of objectivity they ascribe to and which ones are invoked in the debate. Environmental experts who are able to loosely connect diverse objectivity conceptions are more likely considered as trustworthy and authoritative partners in environmental science-policy interfaces.

[8] The advisory practice of 'knowledge at the table' involves participation in policy deliberations as an independent knowledge resource.

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